

M I O | USER GUIDE

REMOTE IO SYSTEM

EXPANSION MODULE :
PWR0A, PWROB,
COM0A, COMOB, COM0C



M2I Corporation

MIO Expansion Module Series

Hardware Manual

Thank you for using Industrial Remote Expansion Module of M2I corporation. Please read this manual carefully to know installing, wiring, operating, servicing and inspecting this equipment.





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Chapter 1 Safety Precautions

■ Before using the product

To use the product safely and effectively, please read the contents of this manual thoroughly before use. Please keep to the safety precaution, for it is to prevent accidents and potential danger from occurring. Safety precaution is classified into 'Warning' and 'Caution' and their meanings are as follows. Also the indicated illustrations on the product and in the manual have the following meanings.




 Warning	Violating the instruction may result in serious personal injury or death
 Caution	Violating the instruction may result in slight personal injury or product damage
	Be cautious, for danger may be present
	Be cautious, for there is a possibility of an electric shock

■ General Precautions



-  Do not push hard, or use thick and sharp tools like gimlet, screwdriver, pen, etc.). It can cause a malfunction.
-  Do not use or store the product in highly vibrating environment.
-  Keep the foreign substances (water, liquid, metal powders, etc.) out of the product. These can crack the product or cause an electric shock.
-  Make sure to keep the distance minimum 30cm from product when you use radio or cell phone.
-  Do not use or store the product under direct sunlight.
-  Do not touch the product or adapter with wet hand. It can cause an electric shock.
-  Do not use the product in flammable environment with combustible liquid, gas or dust.
-  When you store the product long term without any use, keep the product out of the direct sunlight and humid condition.

■ Design Precautions **Warning**

Install protection circuit on the outside of Products to protect the entire control system when external power supply or Products have problems.

-  As the malfunction & incorrect result of Products could damage the stability of the entire systems and human body, you must install damage preventing interlock circuit such as emergency stop, Protective circuits, positioning upper and lower limit switch and interlock for forward/reverse operation.
-  When computer or other controllers communicate and exchange data with products or change operation mode of products, set up protective sequence program in PC or Controller for protecting system from communication error.
-  The output signal or communication lines should be separated from the power line or high tension wire. They should be installed 100mm (3.94 Inch) or more from each other.

■ Wiring Precautions **Warning**

-  Be sure the wiring is done correctly by checking the product's rated voltage and the terminal layout. Incorrect wiring could result in fire, damage or malfunctions.
-  Tighten the terminal screw with the specified torque. If the screws of terminal are loose, it could result

in short circuit, fire, malfunctions.

- ❗ a. Grounding should be the Class 3 grounding. The cable for grounding should be more than 0.812mm²(20AWG).
- ❗ b. grounding point be closed to the products and make short the distance to the ground cable if possible.

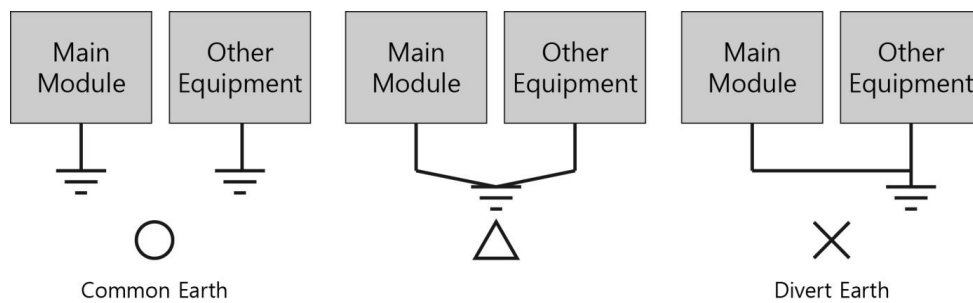


Fig. Grounding Example Diagram

■ Installation Precautions **Caution**

Do not install the location where exceeds allowed temperature. Product can be damaged or shorten the life. Especially Install environment as below should be avoided.

- ⊘ Do not Install product to the place which the ambient temperature is out of limits, from -10°C to 50°C or on the surface of control board which high pressure equipment is installed.
- ⊘ Do not install to the place where strong shock or vibration continuously have impacted on product.
- ⊘ The space between back of product and back of control board must be more than 100mm for maintenance and ventilation. If this product is installed in sealed area, a cooling fan must be installed also.
- ⊘ Use the product Indoor only.
- ⊘ Use the product under 2000M altitude.
- ⊘ The length of power cable should be 3M(10 feet) or less.

■ Disposal Precaution **Caution**

When you dispose of product, please treat it as industrial waste. It can create poisonous substances or explosion.

- Wiring should be done by 24VDC insulation source with limited voltage, current, and fuse, or a class 2 circuit.

Chapter 2 Overview

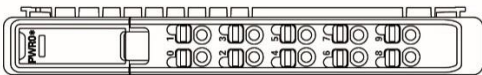
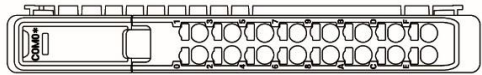
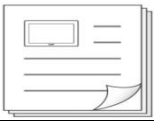
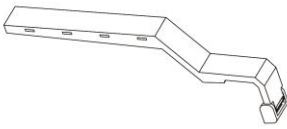
2.1 Product Overview

This industrial remote expansion module is industrial-needed device with high durability. The purposes of this product are supplying coupler module's auxiliary power, separating filed power, and additional supplying of field power. Also, it is used for increasing the number of field power points so that can help simple installation.

2.2 Package Contents

Package contents are below.

Make sure that all of components are in the package Series before using.

Name		Figure	Qty
Main Unit	MIO-PWR0*		1
	MIO-COM0*		1
User Manual			1
Accessories (Separate sale)			User Option

2.3 Explanation of Model name

2.3.1 Coupler Module Series

Base Unit	Unit Type	Communication Type	Type
MIO-	C: Coupler unit	MR: ModBus RTU MT: ModBus TCP EC: EtherCat TCP CO: CANopen	0A: Basic

2.3.2 I/O Module Series

Base Unit	Data Type	Input / Output	Signal	Point	Type
MIO-	A: Analog D: Digital	I: Input O: Output	N: SINK P: SOURCE R: RTD ^{*1)} , Relay ^{*2)} V: Voltage C: Current	02 04 08 16	-01: Basic

* 1) RTD is only for MIO-A***** units.

* 2) Relay is only for MIO-D***** units.

2.3.3 Expansion Module Series

Base Unit	Functions and Specifications
MIO-	PWR0A: Adding System Power or Field Power PWR0B: Adding Field Power com0a: Extension of Filed Power +24V contacts into 16 com0b: Extension of Field Power +0V contacts into 16 com0c: Extension of Field Power +24V / +0V contacts into 8 / 8

Chapter 3 General Specifications

3.1 Electrical Specifications

3.1.1 MIO-PWR0A

Input Voltage (Vin)		Insulated 24VDC(20~28VDC)
Output Voltage (Vout)		5V, 1.4A(Max. 3A limit)
Power	Consumption	0.1W or less
	Voltage endurance	24VDC, 10ms or less
	Insulation Resistance	500VDC, 10MΩ

3.1.2 MIO-PWR0B, COM0*

- No consumption of system power.

3.2 Interface and Functions

3.2.1 MIO-PWR0A

Status LED	System Power, Field Power, Connection
------------	---------------------------------------

3.2.2 MIO-PWR0B, COM0*

Status LED	Connection
------------	------------

3.3 Outer Electrical Specification

Model Name	Input/Output Voltage	Allowable Current
MIO-PWR0A	24VDC(11~28.8V)	Max. 7A
MIO-PWR0B		
MIO-COM0A		
MIO-COM0B	0VDC	
MIO-COM0C	24VDC(11~28.8V), 0VDC	

3.4 Environmental Specification

Operation Temperature (°C)	-10 ~ +50
Storage Temperature (°C)	-20 ~ +60
Operation Humidity (%RH)	0 ~ 90(No dew)

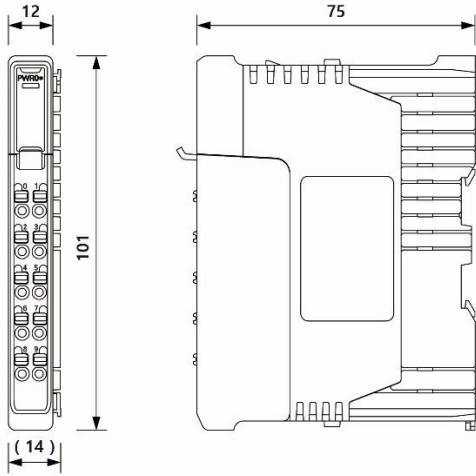
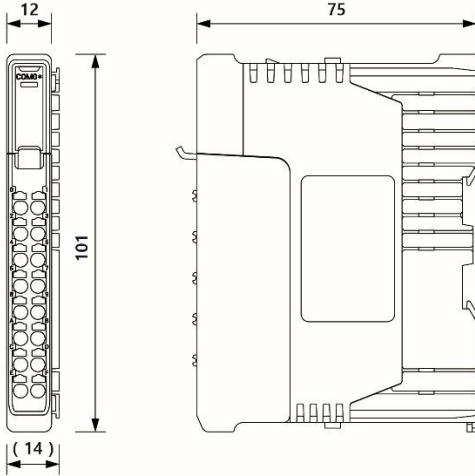
Atmosphere	No corrosive gas
Vibration Endurance	Amplitude: 10≤F < 25Hz(2G) X,Y,Z each direction(for 30 minutes)
Noise Immunity	1000Vp-p(Pulse width 1μs)
Static Electricity Discharge	Connective discharge from EN61000-4-2: ±4kV
Shock Endurance	10G X,Y,Z each direction(for 3 times)
Surge Voltage	500V(Line-Line)
Ground Connection	Class 3(Under 100Ω)
Protection Classification	IP20

3.5 Structure

Cooling	Natural air circulation
Installation Method	Standard DIN Rail(35mm)
Case Material	PC(Resistance to flame)

Chapter 4 Parts Identification and Specifications

4.1 Remote Expansion Module

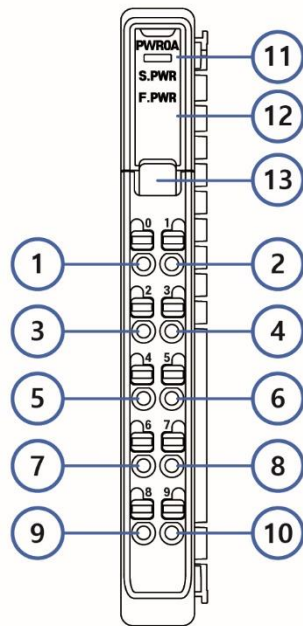
MIO-PWR0*	MIO-COM0*
	

Model	W (mm)	D (mm)	H (mm)
MIO-PWR0A	12	101	75
MIO-PWR0B			
MIO-COM0A			
MIO-COM0B			
MIO-COM0C			

4.2 Part Name and Specification

4.2.1 MIO-PWR0A

- Additional system power and field power supply

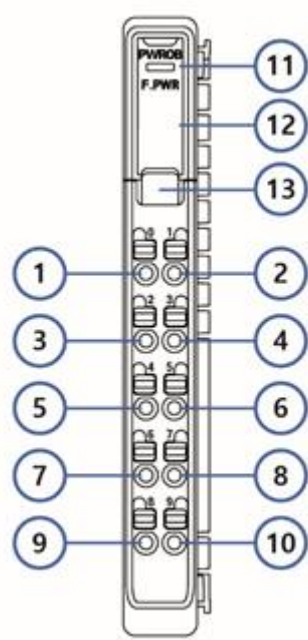


No	Name	Description
1	24V	System Power +24V
2	24V	
3	24G	System Power GND
4	24G	
5	F.G	Ground Connection
6	F.G	
7	F24G	Field Power 0V
8	F24G	
9	F24V	Field Power +24V
10	F24V	
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Input System Voltage	24Vdc typ. (20V ~ 28V)
LED Indicator	2 White States, 1 Green Operating State
Input Field Power	Typ. 24Vdc(11 ~ 28.8Vdc) and 0V
Allowable current	Max. 7A
Pin No.	Removable Terminal Block 10P

4.2.2 MIO-PWR0B

- Additional field power supply

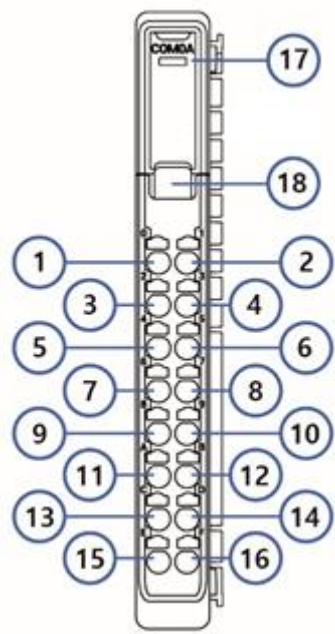


No	Name	Description
1	N.C	Not used
2	N.C	
3	N.C	
4	N.C	
5	F.G	Ground Connection
6	F.G	
7	F24G	Field Power 0V
8	F24G	
9	F24V	Field Power +24V
10	F24V	
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
LED Indicator	1 White States, 1 Green Operating State
Input Field Power	Typ. 24Vdc(11 ~ 28.8Vdc) and 0V
Allowable current	Max. 7A
Pin No.	Removable Terminal Block 10P

4.2.3 MIO-COM0A

- Field Power +24V contact extension, 16 contacts

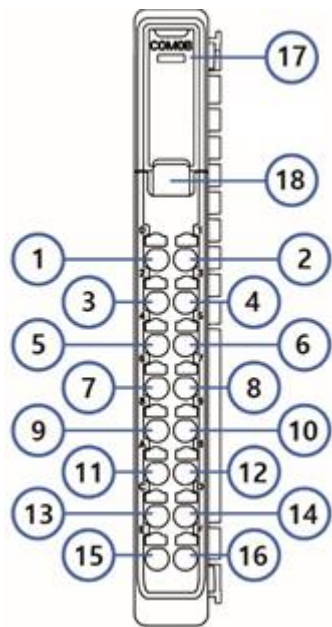


No	Name	Description
1	F24V	Field Power +24V
2	F24V	
3	F24V	
4	F24V	
5	F24V	
6	F24V	
7	F24V	
8	F24V	
9	F24V	
10	F24V	
11	F24V	
12	F24V	
13	F24V	
14	F24V	
15	F24V	
16	F24V	
17	System Status LED	Expansion Module Status LED - GREEN: Normal Operation
18	Detachment Hook	Hook to detach Terminal Block

Name	Description
LED Indicator	1 Green Operating State
Output Field Power	Typ. 24Vdc(11 ~ 28.8Vdc)
Allowable current	Max. 7A
Pin No.	Removable Terminal Block 10P

4.2.4 MIO-COM0B

- Field Power 0V contact extension, 16 contacts

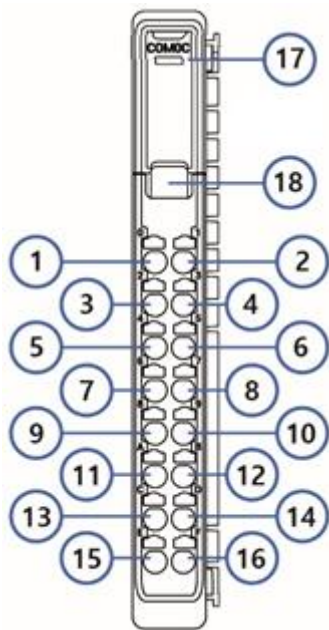


No	Name	Description
1	F24G	Field Power 0V
2	F24G	
3	F24G	
4	F24G	
5	F24G	
6	F24G	
7	F24G	
8	F24G	
9	F24G	
10	F24G	
11	F24G	
12	F24G	
13	F24G	
14	F24G	
15	F24G	
16	F24G	
17	System Status LED	Expansion Module Status LED - GREEN: Normal Operation
18	Detachment Hook	Hook to detach Terminal Block

Name	Description
LED Indicator	1 Green Operating State
Output Field Power	Typ. 0V
Allowable current	Max. 7A
Pin No.	Removable Terminal Block 10P

4.2.5 MIO-COM0C

- F2 Field Power +24V / 0V contact extension, 8 contacts / 8 contacts



No	Name	Description
1	F24G	1. F24G: Field Power 0V 2. F24V: Field Power +24V
2	F24V	
3	F24G	
4	F24V	
5	F24G	
6	F24V	
7	F24G	
8	F24V	
9	F24G	
10	F24V	
11	F24G	
12	F24V	
13	F24G	
14	F24V	
15	F24G	
16	F24V	
17	System Status LED	Expansion Module Status LED - GREEN: Normal Operation
18	Detachment Hook	Hook to detach Terminal Block

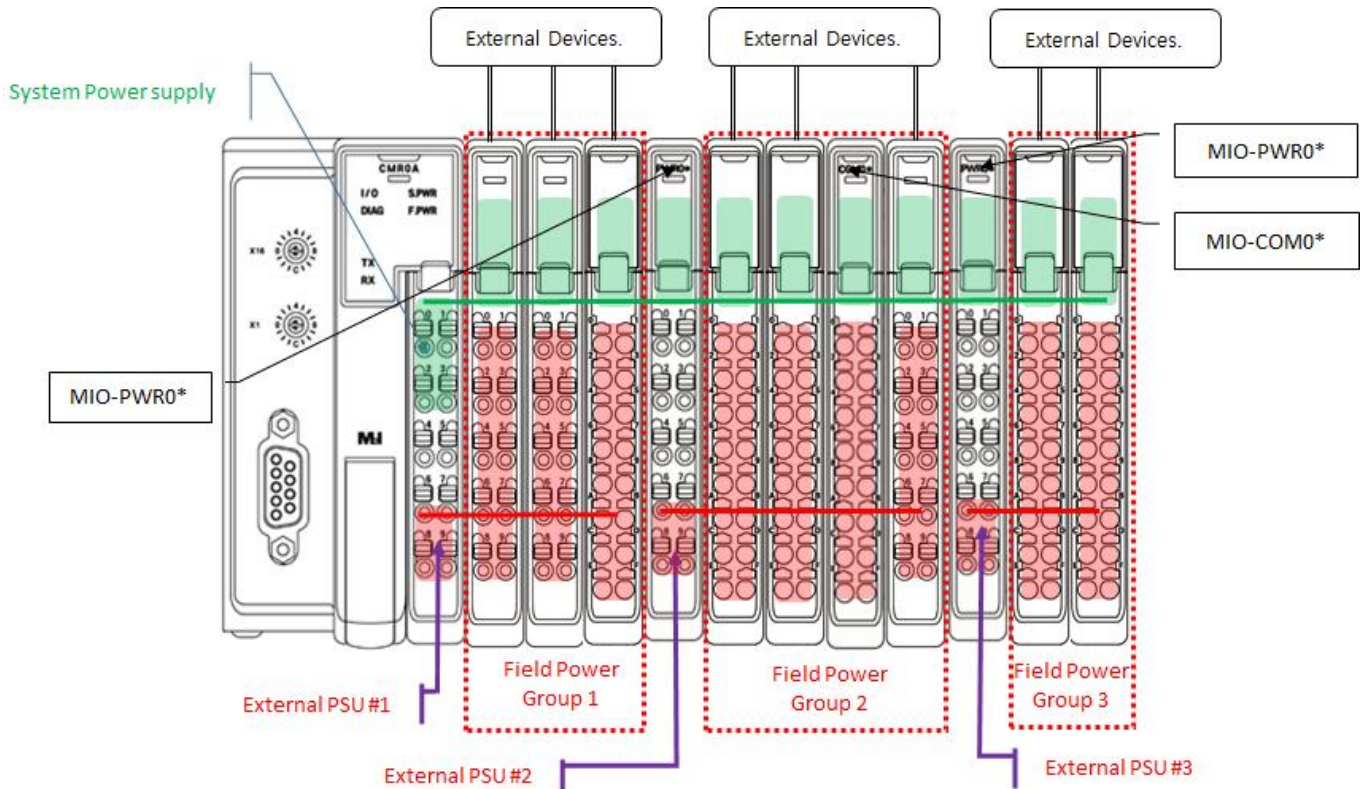
Name	Description
LED Indicator	1 Green Operating State
Output Field Power	Typ. 24Vdc(11 ~ 28.8Vdc) and 0V
Allowable current	Max. 7A
Pin No.	Removable Terminal Block 10P

Chapter 5 Operation / Settings

5.1. Supplying and Distribution of System Power and Field Power

Please check below descriptions to supply additional power for I/O module.

- (1) The Field Power is separated based on Coupler Module or Power Expansion Module (PWR0*).
- (2) Left side of Coupler Module or Power Expansion Module (PWR0*) is cut, and its supplied field power is supplying to modules on right side.



- (3) If there are 2 Power Expansion Modules (PWR0*), it will make Field Power [Group 1], [Group 2], and [Group 3]. If outer device is out of allowable power current, putting multiple Power Expansion Modules (PWR0*) will make normal operation. And using Power Expansion Modules (PWR0*) can separate or supply a Field Power when Operation Power is connected with other devices at same time.

5.1.1 PWR0* Module Comparison

Below table is showing the differences between Coupler and PWR0* modules.

	System Power	Field Power		Description
		Supply	Separate	
Coupler	Supply	O	X	System / Field Power Supply
PWR0A	Supply	O	O	System / Field Power Supply, Power Increase by combine with Coupler Module
PWR0B	X	O	O	Field Power Supply

5.2 COM0* Expansion Module

This module is used for expanding connected Field Power's points from Coupler and PWR0* modules.

	F24V	F24G	Description
COM0A	16 Points	N/A	Connect through Internal Circuit
COM0B	N/A	16 Points	Connect through Internal Circuit
COM0C	8 Points	8 Points	Connect through Internal Circuit

Chapter 6 Installation / Wiring Warning

6.1 Location

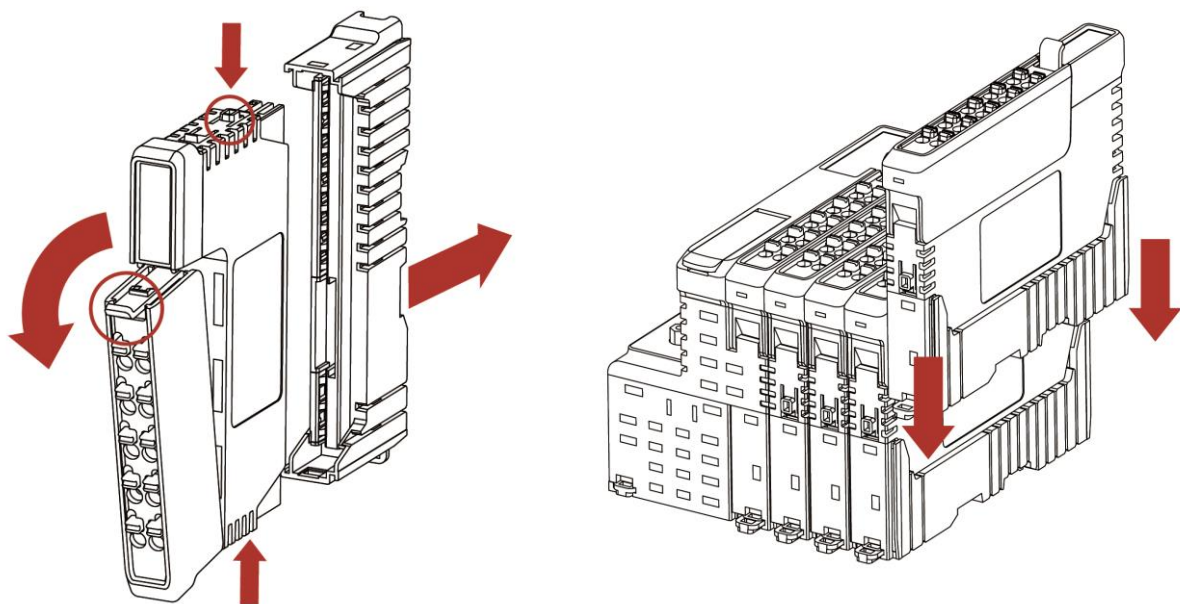
- (1) Keep more than 100mm distance from other devices for safe operation and eliminate mechanical risk factors around.
- (2) Installation environment should be -10~50°C temperature and 10~80% humid.
- (3) If an installation is in sealed condition, cooler fan should be installed.
- (4) Keep power cables away from communication cables. A noise can cause a malfunction.
- (5) Install the product keeping distance from cables which has a lot of noise, and wiring length would be short.

6.2 Outer Protection

Operation of product may not be normal cause of part malfunctions like relay or transistor. Important output signals are recommended to protected by outer protection device or circuits.

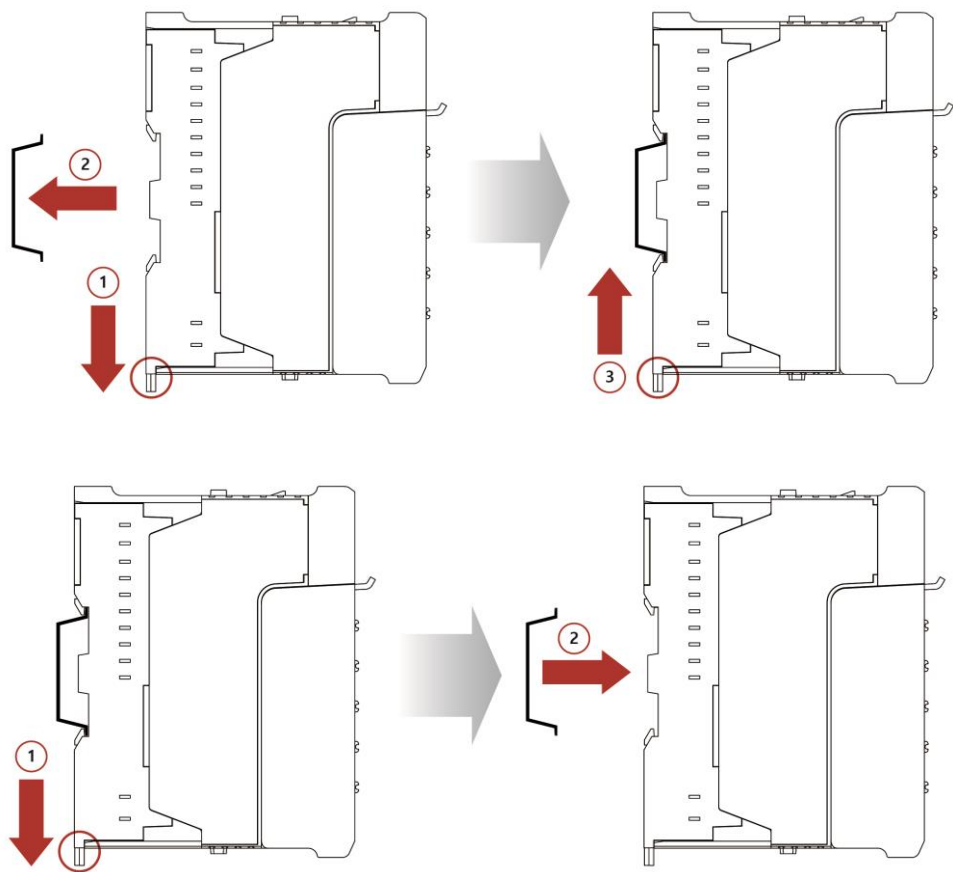
6.3 Module Detachment and Replacement

This product supports HOT SWAP function (replacing parts without power off), and each part can be detached as below images.



6.4 DIN RAIL Attachment

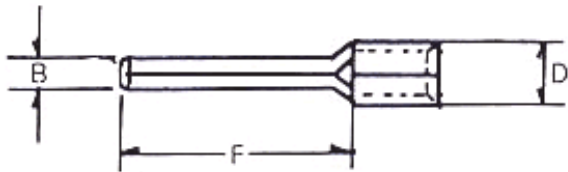
This product has DIN RAIL(35mm) Hook as standard.



6.5 Power, Ground, Communication Cable Specification

6.5.1 Pin Terminal Attachment  Warning

Caution: Using Pin Terminal when wiring power and ground cable is important point for keeping a condition of product's condition. If you do not follow below table's standard of Pin Terminal, it can cause cable's malfunction and electric shock.



	B	F	D	AWG Spec.
Available	1.1 ~ 1.5mm	8 ~ 10mm	3mm or less	26 ~ 20
Recommended	1.5mm	10 mm		20

6.6 Ground Wiring Warning

- (1) This product has enough anti-noise measure, so except that there are many noises. Specially, the ground is not needed. When doing ground, please refer to the followings.
- (2) The ground should be the exclusive ground. The ground should be type 3 ground (ground resistor is less than 100Ω).
- (3) When not doing the exclusive ground, do common ground like figure B.

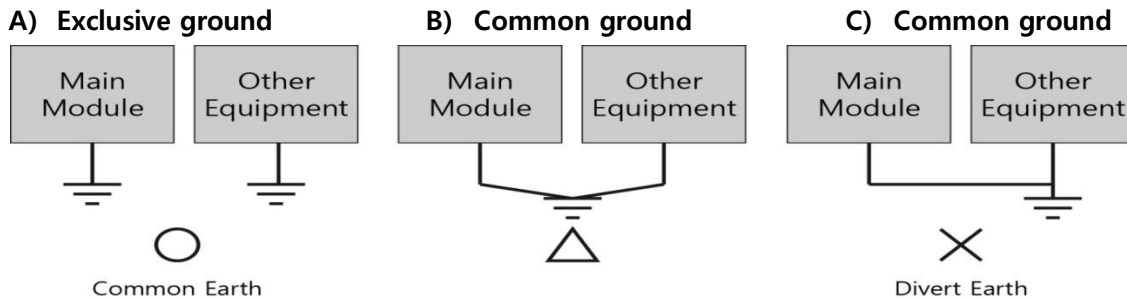


Fig. Grounding Example Diagram

- (4) Put the point of the ground near product and shorten a Ground line.

Chapter 7 Maintenance

7.1 Cleaning the Display

When the surface become dirty, spray the cleaning solution onto a soft cloth and wipe the device.

7.2 Periodic Check Points

Check the followings periodically for best condition of the device.

- (1) Environment
 - 1) Is the operating temperature within the allowable range (-10°C~50°C)?
 - 2) Is the operating humidity within the allowable range (0%~90%RH)?
 - 3) Is the Surrounding pollution no corrosive gas?
- (2) Power
 - 1) Is the input voltage within the change range?
- (3) Related Items
 - 1) Check any foreign containments or pollutions on contact points.
 - 2) Check the status of assemble after detachment.

7.3 Trouble Guide

- (1) If there is any trouble of product, stop the operation and inform about the trouble to a repair department of M2I Corporation.
- (2) Inspection and Repair is allowed to the people who is authorized or approved from M2I Corporation.
- (3) If the trouble is not cleared in operation field, a product can collect and repaired in M2I Corporation.
- (4) Crashes or Malfunctions from operations or operation conditions beyond the standards of this manual, is not belong to M2I Corporation.

Chapter 8 Products Label



Manufacture (AS): M2I Corporation

11-35, Simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14055 , Republic of Korea

Device Type: Industrial Remote Expansion Module

Model Name: MIO-PWR0A

Operating Temp: $-10^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$

Power:

- MIO-PWR0A: 24VDC, 4W or less

KC Certificates No:

Serial No:



Manufacture (AS): M2I Corporation

11-35, Simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14055 , Republic of Korea

Device Type: Industrial Remote Expansion Module

Model Name: MIO-*****

Operating Temp: $-10^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$

Power:

- MIO-PWR0B: 5VDC, 0.1W or less
- MIO-COM0A: 5VDC, 0.1W or less
- MIO-COM0B: 5VDC, 0.1W or less
- MIO-COM0C: 5VDC, 0.1W or less

KC Certificates No:

Serial No:

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- When using M2I equipment, thoroughly read this datasheet and associated manuals introduced in this datasheet, also pay careful attention to safety and handle the module properly.
- Store this datasheet in a safe place so that you can take it out read it whenever necessary.